Chapter 3

Future Endeavors

DON made great strides in FY02 setting the groundwork for the two biggest restoration issues being faced over the next five years: sediment and munitions response. While developing the framework with which to address these issues, DON also maintained the progress it has been making throughout the rest of the Installation Restoration Program (IRP).

- DON's Munitions Response Program (MRP) was established to address unexploded ordnance, discarded military munitions, and chemical residues of munitions at locations other than operational ranges;
- DON developed a policy for addressing contaminated sediment, and will develop implementing guidance for the field; and
- DON remains on course with its environmental restoration goals, and expects to complete Installation Restoration Program requirements on schedule by the end of 2014. DON will continue to develop policy and guidance to facilitate this objective.

In the next five years, DON will continue making progress in the Installation Restoration Program.

Community Involvement

DON believes that proactively working with communities is the key to meeting its goals and conducting successful cleanups. Through all of our future restoration endeavors, community input will be an important component of our planning. DON has found that developing partnerships with stakeholders is imperative for moving forward. As DON

continues to address sediment issues and develop its Munitions Response Program (MRP), the affected communities will be involved in the actions. To that end, DON will continue to look into different ways to interact with the Restoration Advisory Boards (RABs), via workshops, newsletters, and other means of communication. The input DON received at the 2001 RAB workshop has been valuable in assessing community perceptions of our policies. In the next few years as DON works on building the new Munitions Response Program and closing out IRP sites, community feedback will continue to be a guide.

IRP Site Closeout

DON's goal is to complete all requirements at high relative-risk IRP sites by 2007. DON will continue to examine methods to reduce operations and maintenance costs, which will help avoid future costs. As this milestone in the program is approached, DON will need to address two important issues.

The first issue is how to address the cleanups where contaminants are co-mingled with contaminants from other parties. Because so much of DON property is adjacent to waterways, there are many instances where contaminants are co-mingled. DON will work collaboratively with the other parties to address this issue.

The second issue is determining when to achieve site closeout status, versus response complete status. As work to transfer property for beneficial reuse continues, DON wants to ensure that the restorations are complete, and that it will not be necessary to come back at a later date and do more cleanup work. Many sites, especially at BRAC installations, have Land Use Controls (LUCs) in place that help determine the future uses allowed for the land. These LUCs impact the cleanup remedies used. DON is looking at the impact on the cleanup requirements should the land use change after DON

has completed cleanup requirements. For example, after achieving a response complete status, a new owner, the regulators, or another interested party could request a different land use and the Navy could be required to come back and do more cleanup for the requested new use.

Munitions Response Program

Challenges

DON has been actively involved in the development of the new Munitions Response Program (MRP). This new initiative, funded under the Defense Environmental Restoration Program, sets program eligibility for conducting responses to Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC).

The issues associated with munitions response are different than those faced in our traditional Installation Restoration Program. Among our biggest challenges will be gaining recognition and acceptance of this fact and finding innovative, protective and cost effective solutions.

- Munitions and Explosives of Concern (MEC): Identifies the explosives safety hazards that may be addressed during a munitions response and includes the following:
  1. Unexploded Ordnance (UXO) as defined in 10 U.S.C. 2710 (e) (9);
  2. Discarded military munitions, as defined in 10 U.S.C. 2710 (e) (2);
  3. Soil containing explosive materials in a concentration high enough to present an explosive safety hazard; and
  4. Buildings, equipment, or other materials contaminated with residual explosive materials in a concentration high enough to present an explosive safety hazard.
- Munitions Constituents (MC): Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and

> emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710 (e)(4))

The biggest challenge that DON faces as the Munitions Response Program matures, is gaining recognition and acceptance from the states, Tribes, and federal regulators, and affected stakeholders, that the way DON responds to military munitions is very different than addressing typical hazardous waste contamination found in the Installation Restoration Program. Not only must we address the environmental impacts of munitions constituents (MC) (chemical residues from military munitions such as lead, RDX, or TNT found in soils and groundwater) we must also address the more immediate explosive safety risks associated with unexploded ordnance and discarded military munitions. This includes not only safety risks to the public, but also the risks to response personnel in the detection and removal of ordnance items. Because of the innate risks posed by unexploded ordnance or discarded munitions, and because of age or physical condition, a visual inspection may not always determine whether or not the item is inert. Therefore, all encountered ordnance is initially treated as if it were live. This adds a layer of complexity to the detection, removal and cleanup process, and requires a unique set of skills possessed only by trained ordnance professionals. A recent removal action for abandoned munitions and explosives at Naval Weapons Station Seal Beach, California on page 3-11, illustrates the level of effort for these sites. Another example of the layers of complexity in the cleanup of MRP sites can be seen on page 3-13 with the public response to DON sites on Vieques Island, Puerto Rico.

Mapping a Plan for the Future

Although the DON Munitions Response Program is in its infancy, it continues to make progress. In August 2002, the Navy completed a second inventory, as a follow on effort to the inventory conducted in 2000. This more extensive inventory

will form the program baseline from which we will determine our cost-to-complete and future programming requirements. The Marine Corps has also developed their program baseline and conducted archive searches, the equivalent of preliminary assessments, at a number of activities.

Current DON Munitions Response Program funding is $8 million per year through FY2007. This initial level of funding will provide continued support at MRP sites where work is already underway. It will also afford the Navy the opportunity to begin conducting MRP preliminary assessments for the more than 100 other sites identified in the inventory. An intensive, three-year effort is underway to conduct preliminary assessments for all identified sites to determine what further actions may be required.

DoD is in the process of developing a Munitions Response Directive that will set overarching policy for conducting munitions responses at all locations other than operational ranges. DON played an integral part in its development and, when completed, will publish implementing policy and guidance for the Navy and Marine Corps.

DON also supported another tri-service initiative to develop a Munitions Response Site Prioritization Protocol in response to Congressional direction. The prioritization protocol is made up of three basis modules that address potential threats that may be present at any MRP site –

- Relative Risk Site Evaluation Module – addresses risks posed by chemical contamination, either from munitions constituents or other hazardous waste;
- Explosive Hazard Evaluation Module – addresses the explosive safety risks that may be posed by Unexploded Ordnance (UXO) or discarded military munitions; and

- Chemical Warfare Materiel Hazard Evaluation Module – addresses the unique hazards posed by chemical warfare materiel as bulk agents, chemical agent identification sets (CAIS), or as explosively configured chemical munitions.

Other evaluation criteria, such as stakeholder concerns, will also be considered as part of the overall prioritization process. DoD plans to publish the final prioritization protocol in the Federal Register early in 2003, conduct training for all services, and apply the protocol to all identified MRP sites.

Reaching Out to Regulatory Partners

In an ongoing effort to engage our regulatory partners, DON participates in the Munitions Response Committee (MRC). The MRC is comprised of affected federal agencies including DoD, EPA, Federal Land Managers (FLMs) such as the Departments of Interior and Agriculture, and state regulatory agencies. The goal of the MRC is to establish a common framework and understanding between all partners that includes:

- Collaborative decision-making processes that are acceptable to all parties. When agreed to, these collaborative processes will:
  1. Afford the states the opportunity to review and approve the adequacy of munitions response actions, subject to the processes developed for dispute resolution and reservations of rights.
  2. Be endorsed for universal adoption by the Federal agencies and the state organizations represented on this committee
- Ensure protectiveness of response actions
  1. Protect response personnel, the public, and the environment from explosives hazards and other risks during response actions

2. Ensure safe cleanup levels for public health and environment.
3. Develop methods that address —
    a. DoD's come-back commitment
    b. Institutional controls
    c. Consideration of future land use

- Promote consistency in approach across states, EPA, and military components regarding:
    1. Procedures and methods for investigation and subsequent response actions
    2. Methods for prioritizing response actions
- Address complexity and scope of cleanup challenges
    1. Provide for policy and technical guidance for improving munitions response actions
    2. Foster development and validation of improved technologies
    3. Seek adequate funding for protective response actions
- Provide Munitions Response lessons learned to appropriate forums for consideration

Understanding the Program— Addressing the Risks

Over the last year, in collaboration with the Civil Engineers Corps Officers School, (CECOS), DON developed two munitions related training courses. The first course, focused on explosives safety, provides basic identification and avoidance training for base personnel and Remedial Project Managers (RPMs) to alert them to the dangers of unexpected encounters with unexploded ordnance or discarded military munitions. The second, more comprehensive, DON Munitions Response Site Management Training Course, is designed for Remedial Project Managers

(RPMs), Remedial Technical Managers (RTMs) and BRAC Environmental Coordinators (BECs) who plan, scope or review cleanups at MRP sites. The course describes the types, functions, and hazards of munitions, states the applicable policies and regulations, discusses technologies, and identifies essential elements of projects where munitions are encountered. A number of course offering were provided during FY02 with additional offerings planned for FY03.

Sediment

Much of DON property borders waterways, making it very difficult to point to one source as the cause of sediment problems. There is a recent trend among regulators and other organizations to develop coalitions that look at the entire watershed rather than one area. In some cases, DON may participate when we have determined that we may have contributed to the contamination of the water body. Approval for this participation must come from CNO. DON is working with the EPA, Army, National Oceanic and Atmospheric Administration (NOAA), and others to develop a sediment framework to be used across all organizations. DON and EPA expect to release this guidance in FY03.

DON is also working with the Interstate Technology and Regulatory Council (ITRC) to develop a series of documents to discuss characterization, remediation, and risk assessment for sediment. These documents should help to clarify some of the technical issues surrounding sediment restoration.

Land Use Controls

The DON is looking at new ways to expedite property transfers. For its BRAC installations, the Navy developed the Land Use Controls Information System (LUCIS), which is a web-based system that shows property lines, deeds, titles, and other information a potential buyer would need to know.

DON is looking at the possibility of developing a similar tool to use at active sites. This tool will help DON manage these properties more efficiently, but will not be publicly available.

Innovative Approaches and Technologies

The DON is taking advantage of new, innovative approaches and technologies as part of the SMART cleanup practices. Incorporating innovation into the program results in another avenue for cost avoidance.

For example, the newly formed NAVFAC workgroup for Installation Restoration (IR) Geographic Information System (GIS)/Data Management was established to develop and coordinate a corporate methodology for enhancing and facilitating the use of IR data through GIS and web based applications. One goal of the workgroup is to develop the Navy Environmental Installation Restoration Data System (NEIRDS), a database that will be used by all the NAVFAC Engineering Field Divisions and Activities (EFD/As), and NFESC to manage all IR Program data. NEIRDS will allow personnel to access, share and evaluate IRP data using information management tools, making evaluation and visualization of data easier and more cost effective. A good example of the potential for cost avoidance using a GIS system to manage and present data is illustrated on page 3-17 for Naval Ordnance Station, Louisville, Kentucky.

Innovative technologies, tools and materials are another source of cost avoidance opportunities. A new material used in the construction of diffusion samplers dialysis membrane, regenerated cellulose, allows the collection of contaminants other than volatile organic compounds, which the traditional material is limited to. The details of this story can be found on page 3-19.

The DON will continue to seek out the most efficient, cost effective, and timely innovative cleanup options to continue to achieve cost avoidances in the Installation Restoration Program.

Policies and Guidance

In FY03, the DON expects to finalize the interim final policy on background chemical levels. The DON and EPA are working together on this policy. Three guidance documents are currently in draft form (Natural Resource Injury, Sediment, and Background Analysis for Sediment), and are expected to be finalized in FY03. DON is also developing a fact sheet to provide instruction and guidance for the Watershed Contaminated Source Document currently under development.

In the next few years, the DON will review its policy on addressing particular contaminants to determine the potential impact of EPA tightening the standards. This is currently an issue for trichlorethylene (TCE). Many cleanups have been conducted to a certain level. If that level is tightened, will DON have to go back to sites considered complete and re-do the cleanup? If the answer is yes, this could have a tremendous impact on the program.

Conclusion

The next few years will be very exciting for the Installation Restoration Program. While DON continues to make progress on many components of the Installation Restoration Program, it is just be beginning the Munitions Response Program. It is hoped that DON will be able to share lessons across the two programs leading to more efficient and cost effective cleanups. Through continued funding, DON expects to stay on track with its program goals.

• *From the Field* •

• MUNITIONS RESPONSE •

Navy Cleans Up Munitions and Explosives at Wildlife Refuge

Naval Weapons Station Seal Beach, California

Project Summary

Naval Weapons Station (NWS) Seal Beach was established in 1944 to store, maintain, assemble, and distribute munitions and explosives to west coast Navy, Marine Corps, Army, and Air Force activities. The base encompasses approximately 5,000 acres. In 1972, 911 acres of saltwater marshland at NWS Seal Beach was designated as a National Wildlife Refuge (NWR). NWS Seal Beach is the only DoD installation with a NWR located on base. Southwest Division Naval Facilities Engineering Command (SWDIV) manages the IRP at NWS Seal Beach.

The Navy recently completed a Non-Time-Critical Removal Action at NWS Seal Beach, California to eliminate potential hazards to base personnel and the public associated with abandoned munitions and explosives. This project was completed at Site Five, located within the boundaries of the NWR. Site Five consists of 4.1 acres, and was previously used as a fill disposal site from the early 1950s to the early 1980s.

Through investigation, SWDIV determined that Site Five contained a mixture of fill material, construction debris, and trash commingled with abandoned munitions, explosives, and explosive-related materials scattered and buried below ground.

Project Description

An extensive geophysical survey of the site proved ineffective in locating munitions and explosives of concern (MEC) in a landfill environment in which MEC items are mixed and buried alongside other metallic scrap and debris. This necessitated the use of special site inspection and quality control (QC) processes to ensure that all MEC, or MEC-related material detected, was removed.

The initial inspection was conducted visually, assisted by the use of metal detectors during soil excavation in six-inch-thick layers. The excavated soil was mechanically screened and sifted, and all items larger than one half-inch in size were separated and visually inspected for the presence of MEC. The mechanical sifting process resulted in two piles of soil and debris (less than, and greater than one half-inch). The oversized material was mechanically screened several times and ultimately spread over the ground where it was inspected visually and then screened using metal detectors.

To achieve the removal action objective, more than 37,000 tons of soil and debris were excavated and screened for MEC. Approximately 13,000 tons of excavated soil were tested and found clean for re-use on base, resulting in a cost avoidance for the Navy. The remaining soil, primarily contaminated with lead, was transported off-site via rail for disposal in order to minimize potential impacts to the surrounding community. The project team successfully located and disposed of over 750 high explosives and munitions, and 615 explosive and munitions-related items.

Rail Transportation Proves Effective

The use of rail for soil transportation to an off-site facility reduced the number of dump trucks required for the project by over 95 percent. The

Continued on page 3-12

Continued from page 3-11

City of Seal Beach, the surrounding community, and regulatory agencies were very pleased with the Navy's initiative to eliminate the need for over 1,000 trucks that would have otherwise driven through the city, emitting diesel exhaust to the environment. Additionally, the use of rail for soil transportation allowed the Navy to assist the Department of Toxic Substances Control (DTSC) in fulfilling the California Environmental Quality Act requirement that ultimately provided the impetus for DTSC and the community to concur with the Navy's Site Five Removal Action. In addition to the environmental benefits, the use of rail was more cost effective than trucks, and resulted in a cost avoidance of approximately $100K.

Small Arms Recycling And Ordnance Disposal

The Navy recovered twelve 55-gallon drums of small arms from Site Five. The Navy thermally flashed the small arms to burn off any remaining explosive residue and then shredded or crushed them prior to recycling. The Ordnance and Explosive Disposal personnel rendered the remaining high explosives excavated from Site Five "safe" through detonation operations conducted on base. The explosive detonation operations were coordinated with the base Public Affairs Officer (PAO), security, local law enforcement, emergency response organizations, and DTSC. Safety to workers and the surrounding community was the number one project priority for the Navy. Thus, the project team included munitions and explosive experts from the Naval Ordnance Safety and Security Activity, Base Explosive Safety Officer, Explosive Ordnance and Disposal, and DTSC. These organizations played a vital role in reviewing and approving the project work plan and safety operating procedures.

New Wetland

Upon completion of the project, the Navy returned approximately 4.1 acres at Site Five NWS Seal Beach to wetland habitat. This accomplishment was highly praised by the US Fish and Wildlife Service, Friends of Seal Beach National Wildlife Refuge, the RAB, and the surrounding community. The project was also well received by the regulatory agencies and public due to the proactive and team-oriented approach of the IRP project management team, which included the Navy, contractors, regulatory agencies, and the RAB. From the study phase to completion of the project, the Navy held several meetings with regulatory agencies and presented the project to the RAB to solicit and alleviate concerns and issues from the public. The Navy also held site visits for the regulatory agencies and RAB members during the fieldwork phase of the project.

• *From the Field* •

• MUNITIONS RESPONSE/PUBLIC INVOLVEMENT •

Vieques Community Involvement Milestones

Vieques Island, Puerto Rico

Background

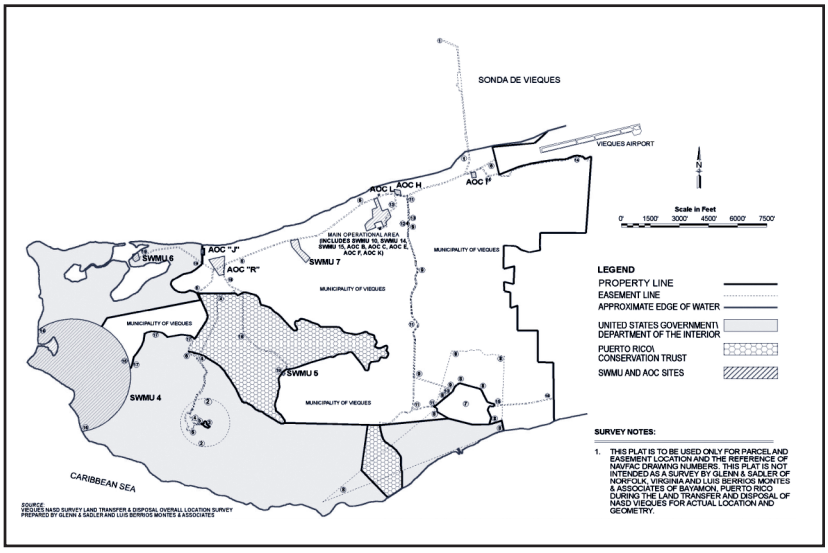
Military operations on Vieques Island, Puerto Rico, began around 1943 and included military training, ammunition storage, and support for military exercises. The Naval Ammunition Supply Detachment (NASD) on western Vieques received, stored, and issued ordnance for support of Navy Atlantic Fleet training activities.

In May of 2001, the Navy transferred approximately 4,000 acres of NASD to the Municipality of Vieques, and 3,100 acres to the U.S. Department of Interior (DOI) as a National Wildlife Refuge. Prior to the transfer, Navy conducted an Environmental Baseline Survey and an accelerated CERCLA Preliminary Assessment/ Site Investigation (PA/SI), identifying 17 potentially hazardous waste sites. Included among those sites was SWMU 4, the inactive open burn/ open detonation (OB/OD) site, potentially contaminated with munitions and explosives of concern (MEC) and located on the property transferred to DOI.

Preliminary information indicates the OB/OD site covered an area of approximately 40 to 50 acres and was utilized from the late 1940s until the 1979 for the thermal destruction of waste munitions, fuels and propellants. Further investigation is underway to ascertain the specific number of OB/OD pits contained within the site and the nature and extent of the ordnance that was detonated within the pits. Navy is conducting the investigation and cleanup of the OB/OD site as part of its Munitions Response Program (MRP) under the CERCLA regulatory framework.

Coordination With Federal Agencies

Due to the accelerated schedule for transfer of the property from the Navy to DOI and the Municipality of Vieques, it was imperative to establish effective communications with the various federal and state agencies that are involved. This included the U.S. Environmental Protection Agency (EPA), Puerto Rico Environmental Quality Board,



Western Vieques.

Continued on page 3-14

Continued from page 3-13

Municipality of Vieques, DOI, Department of Defense Explosives Safety Board (DDESB), Navy Ordnance Safety and Security Activity (NOSSA), Naval Facilities Engineering Command, Atlantic Division (LANTDIV), and Naval Station Roosevelt Roads (NSRR).

LANTDIV provides an overall project management and execution role and established vital communication links among all agencies to facilitate property transfer and cleanup. This included reviewing technical work plans and reports prepared by the contractors, coordination with NOSSA and DDESB to ensure ordnance investigation and cleanup activities are consistent with current Navy and DoD explosives safety policy, partnering with EPA to facilitate rapid review and concurrence on documents, and establishing a community relations program with the local Vieques community.

Community Involvement

Since June 1999 the Navy has been working in a highly charged atmosphere stemming from the Navy's training activities on the eastern end of the island. Community involvement efforts have been challenging, but worthwhile, as the Navy continues to perform the investigation and response activities on western Vieques.

The backbone of the community involvement program is the Technical Review Committee (TRC) consisting of seven community members, two representatives of the Municipality of Vieques, representatives from Puerto Rico's Environmental Quality Board (PREQB), U.S. Fish and Wildlife Service (USFWS), EPA, the governor's Special Commissioner for Vieques, and Naval Station Roosevelt Roads. Navy has also awarded Technical Assistance for Public Participation (TAPP) funding to assist community members in obtaining independent technical expertise.

To better focus the community on the work being conducted on western Vieques, a public availability session was held in March 2002 with posters in both Spanish and English. In addition, bilingual fact sheets have been prepared and widely disseminated to improve information access by the community.

Initial Assessment of Munitions and Explosives of Concern (MEC)

Although the OB/OD site is located on property that has been designated as a wildlife refuge, with restricted public access, DOI allowed public access to the beach area (Green Beach) adjacent to the OB/OD site. This area was also alleged to contain ordnance and was suspected to be a part of a "Western Training Area". An initial assessment for MEC was conducted at the Green Beach area, including a geophysical survey as well as recovery of identified buried metallic anomalies. No munitions items were found in that area.

As part of the PA/SI an ordnance avoidance survey identified munitions items, ranging from 20 mm projectiles to 60 mm fuses, as far away as 1,500 feet from the suspected location of the OB/OD site. As a result, site security measures were implemented to restrict public access.

Public safety and site security measures included:

- Installing over five miles of fence to secure a 3,000 ft radius around the suspected OB/OD site location;
- Installing warning signs to restrict access to the area and alert the public to the potential presence of munitions, and
- Establishing a Memorandum of Agreement (MOA) between DOI and the Navy that limits public access and future use of the property until Navy completes further assessments evaluating the potential public safety risk posed by unexploded ordnance (UXO) or discarded military munitions.

Phase I MEC Investigation

Based on the results of the initial ordnance avoidance survey, a phased MEC investigation was conducted to meet the following objectives:

- Identify the specific location of the former OB/OD pits that were not previously documented.
- Characterize the nature and extent of the ordnance items in

Continued on page 3-15

Continued from page 3-14

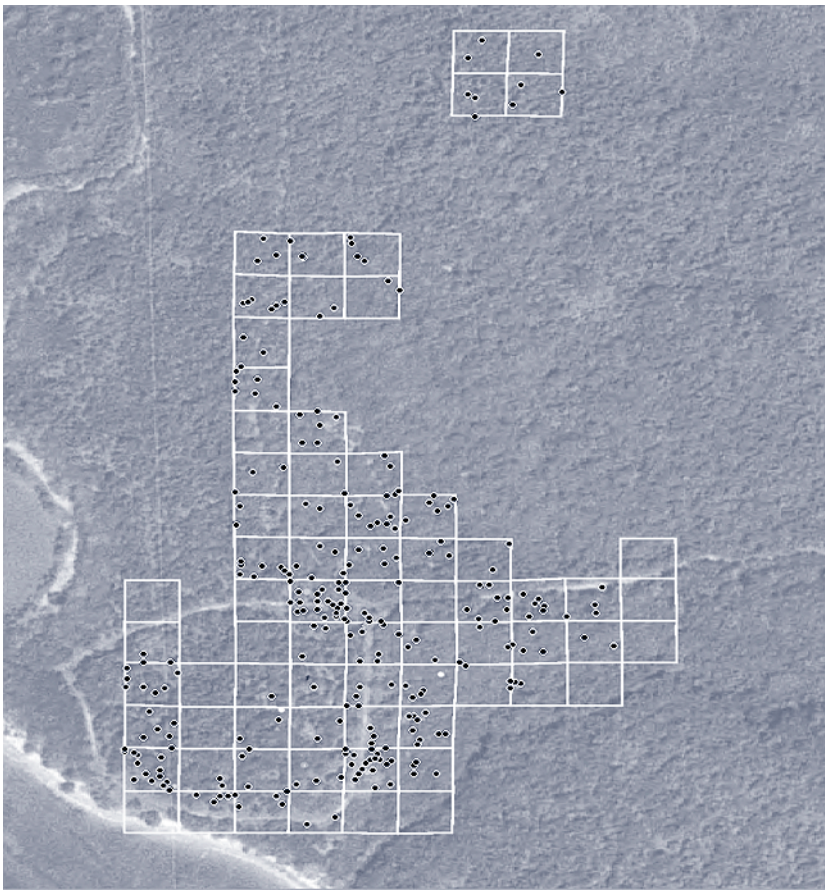
the immediate vicinity of the OB/OD pits to project the area of potential contamination.

- Develop an environmental sampling plan to support a Remedial Investigation at the site.

The investigation included coordination with community and regulatory stakeholders throughout the process covering work plan development, public safety and site security, site vegetation clearance, clearance of surface ordnance, geophysical surveys, re-acquisition of geophysical anomalies, anomaly verification, removal and disposition. NOSSA, the Navy's explosives safety oversight activity, provided explosives safety technical expertise.

Close coordination with DOI was required to ensure that no endangered species were damaged and that the clearance method would provide full and rapid re-growth of the vegetation. To meet these objectives, vegetation clearance over approximately 35 acres was limited to a height of 6" above grade and trees greater than 4" in diameter were left in-place.

Navy conducted an on-site geophysical prove-out and determined the EM-61 to be the most effective ordnance detection equipment for use on the island. Geophysical mapping was completed over a 35-acre study area and field data was digitally recorded for input into a site-wide Geographic Information System (GIS) data management system. The results of the geophysical survey, (see photo above), identified over 4,000 magnetic anomalies, indicating buried metallic items. Five areas showed high densities that were indicative of five OB/OD pits. The density of the magnetic anomalies ranged from 1000 anomalies per acre at the OB/OD pits to less than 50 per acre 1,000 feet away.



Magnetic anomalies in Vieques study.

Reacquisition of the geophysical anomalies was conducted and all detected items were hand excavated to a depth of 1 ft. This level of clearance is consistent with the projected reuse as a wildlife refuge. Of the 4,000 magnetic anomalies identified by the geophysical survey and hand excavated by the UXO technician, only 6 anomalies proved to be false positive readings. This is

Continued on page 3-16

Continued from page 3-15

a detection ratio of over 99% that far exceeds the industry standards of 85% probability of detection.

Items unsafe to transport were blown in place. Ordnance items deemed safe to transport were consolidated and destroyed as part of regularly scheduled detonations. Ordnance related scrap was inspected, certified as free of explosive residue and transported to DRMO at Naval Station Roosevelt Roads.

Summary

The MEC investigation at the OB/OD site resulted in removal of over 700 ordnance items, significantly reducing explosive safety risks to DOI personnel, and to the public. The future munitions response efforts will continue to focus on ensuring public safety within the scope of the intended reuse as a National Wildlife Refuge. Continued effective communication with the community and other stakeholders will be essential for acceptance of the final remedy for this site.

705 Ordnance Items Removed from OB/OD Site

Amount	Ordnance Type
411	20 mm HE Projectiles
171	7.62 mm Blanks
26	M123 Photo Flash Cartridges
18	MK230 Bomb Fuse
16	5.56 mm Blanks
15	81 mm Mortar Tail Boom with Primer
6	MK2 Rocket Warheads
5	20 mm Cartidge Cases
4	MK243 Bomb Fuses
33	Miscellaneous Ordnance Items

A total of 705 ordnance items were recovered over the 35-acre site. The items ranged from 20 mm HE projectiles to MK2 rocket warheads.

• *From the Field* •

• INNOVATIVE APPROACH/COST AVOIDANCE •

Innovative Approaches Expedite the Corrective Measures Study Process

Naval Ordnance Station Louisville, Kentucky

Project Summary

Naval Ordnance Station Louisville (NOSL) is a 143-acre facility closed on 30 September 1997 and is currently in the process of being transferred (early) to the public under BRAC. The Navy is conducting environmental investigations and site closeout under a RCRA permit with the Commonwealth of Kentucky. The use of an environmental Geographic Information System (GIS) to manage data has shortened the schedule for completion of the RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) process at NOSL.

By utilizing GIS technology to manage and evaluate all the environmental data at NOSL, the BRAC Cleanup Team (BCT) streamlined the RFI/CMS process and substantially shortened the cleanup schedule.

The Navy was able to engage EPA and the Kentucky Division for Environmental Protection (KDEP) in discussions concerning sources of contamination, potential pathways, possible receptors, and likely remedial technologies. The Navy found that using GIS to facilitate these discussions greatly enhanced the regulator's understanding of site conditions, resulting in a reduction in their review time of RFI and CMS reports.

Regulatory Involvement

In an effort to shorten the cleanup schedule, the Navy proposed reviewing all data real-time with EPA and KDEP prior to preparing RFI and CMS reports for review. The regulators agreed that they would review the data with the Navy and discuss and debate the technical issues openly. The use of GIS allowed access to all data that would be presented in RFI and CMS reports and enabled the BCT to quickly identify and resolve, major technical issues.

Challenges

The BCT spent eight months reviewing all data collected in an effort to reach a consensus on the source, nature, and extent of contamination for each site. Technical issues were debated; such as groundwater flow direction, metals background in soil, and extent of contamination and data gaps. Through this process, the BCT agreed on which sites required no further action, and identified data gaps.

The challenge in this process was providing all data for BCT review and evaluation in a meeting setting. The GIS enabled this to be done efficiently and comprehensively. The GIS was used prior to the meeting to prepare data packages consisting of maps of the particular site, sample locations, and corresponding contaminants. Each BCT member was able to independently review a copy of the data package prior to participating in the review and discussion session with the other BCT members. During the meeting a GIS operator performed queries of the data and provided requested views, better allowing the BCT members to completely focus on evaluating the data.

Continued on page 3-18

Continued from page 3-17

Developing trust between BCT members helped to facilitate the free exchange of technical opinions and debate. The Navy was able to foster this further by offering full disclosure of all data via the GIS, and providing an opportunity for the regulators to express concerns on any aspect of the investigation. In a relatively short time, the regulators were convinced that the Navy was disclosing all data and honestly evaluating site conditions. Full disclosure of data, possible only by using a GIS, was integral to the regulator's understanding of site conditions.

Aerial view of NOS Louisville.

Cost Avoidance Measures

Overall, utilizing the GIS to manage and review all data helped the Navy save time and avoid costs. Originally, the RFI reports submission and review process was to be completed by September 2003. The actual completion date for the RFI report was September 2001—a two-year savings. The estimated cost avoidance is $1.1 million in additional sampling, report rewriting, and extensive meetings. The CMS reports were approved by November 2002, one year ahead of the original RFI completion date.

Project Successes

By reviewing data prior to development of the RFI and CMS reports, the BCT was able to agree on conceptual site models, chemicals of potential concern, nature and extent, and probable remedial technologies on every site. When the RFI and CMS reports were submitted, the review time was drastically reduced because regulators were intimately familiar with the data, and all potential problems were resolved prior to report submission.

• *From the Field* •

• INNOVATIVE TECHNOLOGY •

New Material Evaluated For Diffusion Samplers

Naval Air Warfare Center Trenton, New Jersey

Project Summary

A new material is being utilized to construct diffusion samplers at the former Naval Air Warfare Center (NAWC) Trenton, NJ to remediate the Trichloroethylene (TCE) Handling Area. These new diffusion samplers will better enable the Navy to collect groundwater samples for inorganic analysis, and reduce the costs of long-term monitoring.

Sampler ready for installation.

The Navy has a long-term monitoring program in place at the former NAWC Trenton to evaluate the effectiveness of the pump-and-treat remedy currently in place. The primary contaminants at the Site are TCE and related degradation products, cis-DCE and Vinyl Chloride. The highly-reducing chemical conditions within the plume have elevated concentrations of inorganics (such as barium and manganese) in the groundwater. In cooperation with the U.S. Geological Survey (USGS), data was collected to evaluate the potential viability for natural attenuation to be an effective remedy for portions of the plume. Diffusion samplers constructed from polyethylene have been proven to reduce the cost of collecting groundwater samples for analysis, however, they are only suitable for the collection of volatile organic compounds (VOCs). For this project, the USGS developed diffusion samplers constructed of regenerated cellulose dialysis membrane. These allow for the collection of groundwater samples for inorganic compounds, nutrients, and other analytical parameters often used for evaluating the effectiveness of natural attenuation.

Site and source area.

Regulatory Involvement

The New Jersey Department of Environmental Protection (NJDEP) was the lead regulator and supported the Navy's proposal to use

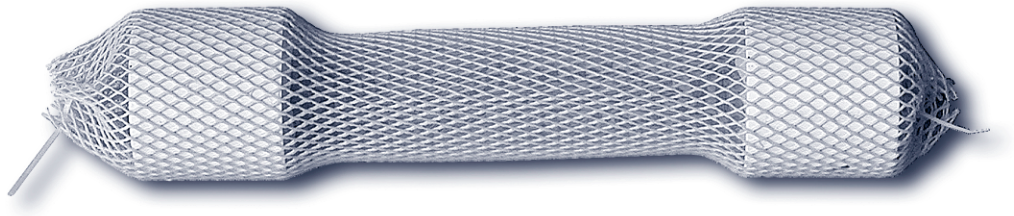
Continued on page 3-20

Continued from page 3-19

regenerated cellulose diffusion samplers. The NJDEP participates in the ITRC Diffusion Sampler Workgroup, and their representatives have been supportive of this investigation. The NJDEP is currently reviewing a report summarizing the results of the trial.

Construction Challenges

It is more difficult to construct samplers from regenerated cellulose dialysis membrane material. Polyethylene samplers can be heat-sealed, while the regenerated cellulose dialysis membrane required the use of clamps to seal the bags. These clamps were constructed to contain a drain valve to simplify sample collection process, and a support sleeve to hold the sampler at the correct depth in the well. A nylon mesh was utilized to protect the bags from jagged edges in the well casings.



Assembled Sampler.